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THE RAINFALL OF 1914.

At the time of writing about 3500 complete records of rainfall during 1914 have reached the office of the British Rainfall Organization, and although it will be several months before these, and about 2000 other records which it is hoped will yet come in, can be checked and examined, it is possible already to give a brief account of the principal features of the year's rainfall.

The noteworthy features of the monthly rainfall were the prevailing wetness of the four months February, March, November, and December. Of these February was wettest in Ireland and December in Great Britain. The rainfall of December was exceptional in all parts of the Kingdom, but especially so in the south of England, where it was probably unprecedented in this respect. The map showing the distribution of rainfall in the Thames Valley, facing page 223, includes the most interesting part of the country in respect of the abnormal rainfall of this month. Of the remaining months, January was everywhere dry, and following an unusually dry December, gave a character to the mid-winter season of 1913-14 greatly in contrast with that exhibited up to the present by the same period of 1914-15. From April to October the rainfall was in general well below the average, though local thunderstorms in England brought the general fall of July slightly above the average, whilst that of August was above the average in Ireland for a similar reason. The persistent dryness of the seven months, and in particular the small rainfall of October, which was the driest month of the year, was probably as abnormal as was the great rainfall of December. It is worthy of remark that in the 57 years' observations at Camden Square the periods December 1913-January, 1914, and April-October, 1914, were both unexampled for low rainfall, whilst March and December each had a fall in excess of any previous month of the same name.

The general rainfall of 1914 as a whole may be compared with the average by means of the following values based upon 139 well distributed stations.

General Rainfall of 1914 as a percentage of the average.

England, South.	Wales.	England, North.	England and Wales.	Scotland.	Ireland.	British Isles.
112	112	103	109	103	105	106

The most notable departures from the average occurred in the south-west of England, where a considerable area extending from Plymouth into Sussex had an excess of more than 20 per cent., culminating in more than 30 per cent. in Dorset. More than 20 per cent. was also found in small areas in South and North Wales, on the coast of Clare and in northern Perthshire. The whole of the south of England, the interior of Wales, and large areas in the west of Ireland and of Scotland had more than 10 per cent. excess, and the average was exceeded over practically all western districts. The east coasts of Ireland and of Great Britain had, however, for the most part, deficient rainfall, and this was most marked in Berwickshire and in east of England between the Humber and the Wash, where a few stations had less than 90 per cent. of the average. Deficient rainfall on the east coast and an excessive fall in the south of England have formed features of the annual rainfall during each of the last four years, and the persistence of this type of distribution seems to call for further study.

TEMPERATURE OF 1914 IN LONDON.

THE most interesting feature of the temperature results shown in the following table is the persistent mildness of the year, January being the only month in which the mean temperature did not exceed the average. February, with a mean temperature 4°·8 above the average was relatively the warmest month, this being mainly due to the high maximum readings of the month. The mean maximum, 51°·1, was 5°·6 above the average, and only in 1869, when it was 51°·7, has February had a higher mean maximum temperature in the past 57 years. The mean temperature of March, though 2°·1 above the average, was actually lower than that of February. In April the mean temperature exceeded the average by 3°·7, and this was again due to the generally high maximum temperatures. There are only four other instances in the 57 years' record when the average shade maximum has been higher in April. Though the summer months were generally warm, there were few days of great heat; 80° was reached on two days in May, seven in June, six in July, five in August, and two in September. Only once was 90° reached, viz., on July 1st, when temperature rose to 93°·7, the highest reading since the record high temperature of 97°·1 on August 9th, 1911. In the last eight months of the year the mean temperature, though always above the average, never exceeded it by so much as 2°, except in December, when the excess was 2°·7. The succession of eleven consecutive months with mean

temperature above the average has only once been exceeded, viz., in the thirteen months May, 1911, to July, 1912. The mean temperature of the year, 51°·8, is the highest in the record, except in 1868 and 1911, when it was 52°·3 and 52°·2 respectively.

Temperature at Camden Square in 1914.

1914	MEAN. 1914	MEAN. Difference from Aver.	MEAN MAXIMUM. 1914	MEAN MAXIMUM. Difference from Aver.	MEAN MINIMUM. 1914	MEAN MINIMUM. Difference from Aver.
	°	°	°	°	°	°
January...	38·2	—0·3	42·4	—0·9	33·7	—0·1
February	44·5	+4·8	51·1	+5·6	38·5	+3·8
March.....	44·2	+2·1	51·1	+1·1	37·9	+2·5
April	51·8	+3·7	62·6	+4·7	41·6	+1·9
May	55·2	+1·2	65·5	+0·9	45·4	+0·8
June	61·7	+1·6	73·9	+3·1	50·8	+0·1
July.....	64·4	+0·9	74·6	+0·2	55·6	+1·4
August ...	64·2	+1·9	75·5	+2·8	54·7	+1·3
September	57·9	+0·2	69·6	+2·2	48·7	0·0
October ...	52·0	+1·9	59·6	+1·9	45·7	+2·0
November	45·1	+1·6	51·0	+1·9	39·9	+1·7
December	42·4	+2·7	47·0	+2·7	37·6	+2·6
YEAR ...	51·8	+1·8	60·3	+2·2	44·2	+1·5

WHAT DO WE MEAN BY THE SEASONS?

By L. C. W. BONACINA.

THE subject raised by Mr. Brodie in his letter on the seasonal limits, in the November number, is one to which I have given much thought, and on which I have written somewhat extensively in this Magazine and elsewhere.

The conventional grouping of winter months into December, January and February, and so on (as authorized by the International Meteorological Committee), is a system based exclusively on the mean temperature of the air, such as it obtains in most temperate land-areas, and though doubtless convenient for some purposes, is painfully lop-sided with respect to the solstices, and fails signally to take account of various other meteorological and astronomical relations which should unquestionably warrant the usurpation of August's place by May in the *three* summer months, and of February's by November in the *three* months of winter. Summer surely is that quarter of the year when the amount of direct light and heat received by the earth over the entire Northern Hemisphere between the Tropic of Cancer and the Pole, is greatest; that is to say it embraces the period May 8th to August 7th, or approximately the months of May, June, and July. The air temperature, of course, is high, especially in July, but that is only incidental to the long days and high sun. Similarly, winter is the opposite quarter, when the sun, being lowest in the heavens, and the days shortest,

the minimum amount of direct radiation is received by the earth; that is, it comprises the period November 8th to February 7th, or approximately the months of November, December, and January. It so happens, however, that in consequence of a well-known physical effect, a temperature lag takes place, whereby the times of maximum and minimum soil and air temperature occur after the midsummer and midwinter months (June and December), respectively, and are continued into the early autumn and spring. But this simply means that, by reason of accumulated heat, autumn is a warm season, though the temperature is falling, and spring, by reason of accumulated cold (if it is permissible to speak so of negative quantity), a cold season, though the temperature is rising. And it is, after all, the amount of direct light and heat, even more than the temperature of the air, to which the periodic changes of plant and animal life most closely correspond, as every observant countryman knows. In August and September very high temperatures often occur in favourable types of weather, but the quality of the heat and the character of light and shade are already autumnal; nor is there the same tendency in the latter part of August for the sudden development of those violent thunderstorms which are such a feature in May—when the sun already strikes with a shaft-like power, apparent even on days when the air is cool. Similarly, bitterly cold as February and March often are, the true darkness of mid-winter can never be simulated, and when, as is common enough, severe weather prevails at the end of November, the meaning of winter is brought out in a far more formidable and vivid manner than when similar weather accompanies the lengthening equinoctial days and steeper sun-light at the end of February. There can, I think, be no question but that the height of the sun in the heavens should out-weigh every other consideration in our arrangement of the seasons, and that summer and winter should signify the solstitial periods, spring and autumn the equinoctial. On a cool or cold day in June one is aware that the sun has but to burst the clouds, and the air may become hot in an hour, even as late as 6 p.m. That is the true height of summer. But in late August and September the sun cannot subvert a generally cool type of conditions in the same way, and for very high temperatures to occur in autumn a favourable combination of factors is required. Again, although the month of February in England has a mean air temperature a trifle below that of December, there occasionally occur in February bursts of true spring weather, with warm sunshine, such as are physically impossible in the depth of winter, however mild the weather may be. This clearly stamps February as a spring or equinoctial month, and shows that it is illogical on the ground of average air temperature to place the month in the same category with December and January.

WEATHER IN THE SEVENTEENTH CENTURY (LAST QUARTER).

By WALTER SEDGWICK.

PART III.—WINTER.

IN the two previous articles of this series the weather during the spring, summer. and early autumn has been considered; *i.e.* from March 26th (the beginning of the year under the Julian Calendar) to October 21st O.S., or, reckoning by the Gregorian Calendar, from April 6th to October 31st. The remainder of the year, roughly five months, is dealt with in this article. It will probably be remembered that these articles are based upon the information given in the Diary, or Rector's Book, kept from 1672 to 1701, by the Rev. William Sampson, Rector of Clayworth, Notts, and sometime President of Pembroke College, Cambridge.

The chief interest of the weather notes of the Rector, which are considered in this article, are those relating to mid-winter, as they throw some light on two controversial questions, viz., (1) Are the winters in England tending to grow milder? and (2) Was snow and hard frost really characteristic of the weather at Christmas time two or three centuries ago?

Before, however, dealing with the weather of Christmas and mid-winter, it is desirable to refer briefly to the weather of November and early winter. As regards November, Mr. Sampson has not given much information. The weather of the month is mentioned in eight years, and it appears that the month was then as now, a wet one. In six years frost or snow is stated to have occurred, and in one year (1700) snow is recorded on five separate days, and even as early as the 3rd, 4th and 5th. In the following year (1701) there was a very mild spell from the 23rd to 25th. There is no account of any prolonged spell of cold, nor even of a spell as cold as that which occurred in London last November, unless it be in 1697, when a frost set in, which, it is stated, brought on a long and sharp winter. This frost was succeeded by extensive floods in December, just as in this winter the cold of November was followed by excessive rains in December.

The weather between November 21st and December 11th O.S. (December 1st to 21st N.S.), is mentioned in eleven years, and on the whole seems to have been very similar to that now experienced during the same period of the year. In only three years is there a reference to a spell of frost, viz., in 1696, from the 12th to 23rd N.S., in 1699, up to the 5th, N.S., and in 1700, from the 12th to 18th, N.S., while there are references to mild or open weather in five years, viz., 1679, 1693, 1695, 1699, and 1700, and to floods in two others, viz., 1696 and 1697.

The next week, December 12th to 18th O.S., corresponds, relatively to the position of the earth in its orbit, to Christmas

week (December 22nd to 28th) of the present time. It is impossible to say from the information given about this week, whether it was more often a cold week or the reverse, but it is clear that it was not always accompanied by frost and snow. The one reference to the day which actually corresponds with the present Christmas Day, is in 1700, when there was "mild weather." In 1683 the week was a very cold one and probably too in 1695 and 1696; on the other hand in 1693 and 1699 it is almost certain that there was no pronounced cold weather.

If, however, the popular conception of "old-fashioned" Christmas weather has come down to us from the Seventeenth Century, it is necessary to consider the observation relating to December 22nd to 28th O.S. (January 1st to 7th N.S.). In one year only (1701), has Mr. Sampson described the weather on Christmas Day (O.S.) itself, and that was a "sore wet day," and was followed by a gale in the night. As regards other years the information given is as follows :—"1681, After Christmas fell abundance of rain; 1683, Very severe frost; 1689, A snowstorm on the 22nd; 1691, Frost set in on the 28th; 1692, Very wet from the 27th to 31st; 1693, Open weather (probably); 1698, Very windy on the 22nd." These records are not numerous, but, as far as they go, they do not bear out the popular idea about Christmas-tide weather, nor do they show that Christmas week during Mr. Sampson's life was accompanied by severe weather, more often than the first week of January at the present time, with which the former week corresponds.

In January, or mid-winter, there are three years marked by very severe weather, viz., 1684, 1692, and 1698; also in 1695 and 1699 the month was probably a cold one. In the other years when information is given, the month seems to have been an unsettled one, and to have been characterised in 1680, 1700, and 1702, by windy or stormy weather.

Taking the winters as a whole the outstanding meteorological event was the very severe frost of 1683-4, the winter of "Frost-Fair" on the Thames. Mr. Sampson's observations are an interesting supplement to the fuller particulars given by John Evelyn, and bear out his evidence of a frost more severe even than that of January-February, 1895, and of any other frost in the lifetime of the present generation. The only other prolonged frost mentioned by the Rector is that of the winter of 1691-2, the severity of which is not borne out by John Evelyn. One other winter was apparently very cold, *i.e.*, 1697-8. For the rest the Diary points to occasional short spells or days of frost or snow, varied by spells or days of rain, high winds or open weather, not unlike the majority of the winters of the present time. It is not possible to speak positively on the somewhat scanty records given by the Rector, but it is at any rate difficult to assert, when the winters of 1879-80,

1880-81, 1890-1, and 1894-5 are re-called to mind, that these records demonstrate that the winters during his residence at Clayworth Vicarage were on the whole more severe (even after allowing for the bitter frost of 1683-4), than the winters exactly two centuries later, *i.e.*, from 1879-80 to 1901-2. There are, however, no records in this Diary of great warmth, which bear comparison with the statement of Pepys on January 31st, 1661, "The ways are dusty and the flies fly up and down, and the rose bushes are full of leaves," or of Evelyn on January 25th, 1662, "Near as warm as at Midsummer in some years." This may be accounted for by the more northerly and colder situation of Clayworth than London.

Before closing these notes, attention is directed to the frequent occurrence of snow and cold weather towards the end of the year, *i.e.*, Lady Day O.S., or April 4th N.S. For instance: "1687, In the end of the year, snow; 1693, March 8th to 10th, 15th, 16th, and 27th, snow; 1694, March 14th, snow; 1695, March 10th, 11th, and 12th snow; 1696, March 10th to 18th, snow, hail and frost, 26th, extreme cold, 27th, deep snow, and 30th, snow all the afternoon; 1697, March 28th, snow; 1698, snowy piercing weather up to Lady and May Day (O.S.); 1699, March snowy; 1701, March 3rd, 6th, and 7th, snow, 31st, sleet; April 1st, a great snow all day and so on to the 4th; 1702, March 11th, wind, rain and snow.

NOTE.—In the following extracts the dates both in the margin and text have been corrected to New Style, except in cases under the heading "Seasons." In these cases it has been found more convenient not to alter the language of the Diary, but where possible the corrected dates in New Style are given in brackets.

Dates. New Style.

1679-80. December 2nd, a very warm season.
January 27th, strong winds this last fortnight.

1681-2. *Seasons.*—After Christmas (January 4th) fell abundance of rain.

1683-4. *Seasons.*—Upon St. Lucy, December 13th (23rd), it began to freeze and continued until the 10th (20th) January; then thawed; on the 14th (24th) day the frost returned: on the 20th (30th) it gave a little, but putting in a fresh the next day continued most violent till the 5th (15th) February, when it began to thaw for all together. From the beginning to the end of it were 52 days. It dried up ponds and rivers and most springs and caused a very great drought. Bread and drink; meats and fruits were almost converted into ice. The hardiest plants felt its force and the perennial more than the annual. Rosemary, sage, fenil, artichokes, etc., were generally killed throughout the country. And upon the thaw Nottingham and Muskham bridges were broken down with ice.

1685-6.		*Seasons.*—A dry February.
1686-7.		*Seasons.*—In the end of the year (*i.e.* March 25th O.S.) snow.
1688-9.	March	10th and 11th, winds that did much hurt to houses, etc.
1689-90.	January	1st, snow above a foot deep on the plain ground, but blown in ricks in divers places as high as ordinary pales; we were fain to have our way cut from the court to the church, and it was as high as our heads on both sides.
1691-2.	January	7th to February 23rd. A sore frost; as long as the famous great frost in 1683, though not as severe.
1692-3.	November	11th, snow; 25th and 26th, frost, snow and wind.
	December	19th, extraordinary stormy winds and rains.
	January	6th to 10th, very wet; 17th, frost puts in; and again on the 25th.
	February	5th, in the night a mighty wind; 23rd, a sharp storm of snow.
	March	8th to 10th, so again (*i.e.* snow); 15th and 16th, snow and high winds; 27th much snow.
1693-4.		*Seasons.*—December, open weather.
	January	19th, snowy, frosty and windy.
	February	14th, high winds.
	March	2nd, rain after long drought; 14th, sharp wind with snow; 23rd, store of rain after a dry season.
1694-5.	December	19th, foggy weather.
	January	11th, it freezes; 15th, thaws; 20th, frost returns with snow.
	February	10th, it began to thaw; 22nd, snow.
	March	10th, 11th, and 12th, snowy again; 22nd, at evening it took to raining. The length of the winter caused a scarcity of fodder.
1695-6.	November	18th, calm the three weeks past; 26th, a wind in the night after a long calm.
	December	15th, calm and mild weather; 16th, a slap of rain; 24th, a very sore snowy day; 26th, a frost.
	January	15th, fine and open.
	February	5th, a very sore snowy morning.
	March	5th, a sharp wind; 10th this month hitherto (*i.e.* since 10th), has been snow, hail, and frost; 23rd, hail and storm after noon; 26th, extreme cold; 27th, a good deep snow; 30th, it snowed all the afternoon.
	April	2nd, a glorious day after much ill weather.
1696-7.	November	20th, stormy rains.
	December	8th, the earth almost swims with water; 12th, freezes sharply to the 23rd; 28th, frost continues to the 1st January.
	February	3rd, a great snow; 9th, a thaw; 13th, snowy and so the 15th, 16th, and 17th; 20th, frost holds on; 22nd, it thaws.
	March	3rd, Fine fair weather enters; 16th, very windy for two

or three days; 28th, this morning (after 2 or 3 days N. wind), fell a snow at least 3 inches deep.

1697-8. *Seasons.*—In November frosts set in and bring on a long and sharp winter. In December waters are so much out as that the Trent overflowing ran against the upper part of trees growing on Saundly Marsh-bank, nigh Gainsborough, and cut some of the trees off in middle over Thwart. In January was frosty and snowy piercing weather up to Lady and May day following.

A long winter made fodder in the spring dear.

1698-9. *Seasons.*—November, rains and frosts by turns. December 1st (11th) snowy; the 22nd (January 1st), very high winds; January snowy and frosty; February, windy; March snowy.

1699-1700. *Seasons.*—November, entrance is rainy, later end snowy; December, begins with frost about 5th (15th) open weather and so all the month; January, 12th to 21st (22nd to 31st), great winds; March, 10th to 19th (21st to 30th), a sharp east wind.

1700-1. November 3rd, 4th, and 5th, snowy; 25th and 26th, snowy and rainy.

December 8th, mild weather; 12th, frost begins and continues to the 18th; 25th, mild weather.

January 20th, thaw; 25th and 26th, a great snow; 28th, a swift thaw; 31st, a great sop of wet on the ground.

February 2nd, rains continue; 9th, gentle thaw; 19th and 22nd, snow with sharp winds.

March 3rd, 6th, and 7th, snow with sharp wind; 9th, frosty; 25th, wet; 30th, sharp winds from N.E. most of this month (O.S.); 31st, sleet of snow.

April 1st, a great snow all day and so on to the 4th.

1701-2. November 3rd, mizzling; 4th, 5th, and 6th, rain; 9th, frost; 23rd, 24th, and 25th, very mild weather.

Seasons.—Christmas Day (January 5th), a sore wet day, and towards the evening and in the night so high a wind, as not only private houses, but divers churches in several counties were much damaged by it. January 9th (20th), very wet and windy to the end of the month; February 1st, (12th) the winds follow us into this month.

February 16th, snowy; 19th, frosty; 21st, rainy; 27th and 28th, high west wind with a driving snow.

March 1st, hard frost; 2nd and 3rd, high west winds again; 6th frosty; 11th, wind, rain, and snow; 18th to 29th, fair and calm without wind or rain; 30th and 31st, sharp east wind.

April 4th, a shower after a month's drought.

ROYAL METEOROLOGICAL SOCIETY.

A GENERAL Meeting of the Royal Meteorological Society was held on December 16th, at the Surveyors' Institution, Westminster, Dr. H. N. Dickson in the Chair.

Mr. W. F. Stacey read a paper on "The Distribution of Relative Humidity in England and Wales." The purpose of Mr. Stacey's investigation was mainly to test the trustworthiness of humidity data. A series of maps were prepared from the records of 91 stations, showing the distribution of mean relative humidity at 9 a.m., during the period 1901-1910, for the twelve months and the year, and also the annual range of monthly means during the same period. The records appeared, by their consistency, to justify the following general conclusions :

(1.) In winter the air over the interior of the country is more moist than that over the coastal regions.

(2.) Minimum relative humidity occurs earlier in the year in the western parts of the country than in the eastern.

(3.) In summer the air over the interior of the country is drier than that over the coastal regions.

(4.) The smallest range of humidity is found in the west; the greatest in the interior towards the east.

No indication appeared of any direct connection between relative humidity and rainfall, but there was evidence of the close relation of the former with temperature. The regions of small and great range of humidity corresponded closely with those of small and great range of temperature.

Dr. Shaw, whilst commenting on the neglect, hitherto, of this important element, and the small progress made in its study, expressed his indebtedness to Mr. Stacey for his paper, and the interest which it aroused. He drew attention to the unfortunate choice of the hour of observation and produced diagrams showing not only the extreme rapidity of the variation at 9 a.m., but the great daily range compared with the small differences between the mean values at the various stations.

Mr. Salter suggested that some of the difficulties introduced by the hour of observation might be eliminated by the study of absolute humidity rather than relative humidity.

Mr. Dover gave some interesting explanations for local variations, which he based on 25 years of observations. He considered the subsidiary maximum observed in June to be the effect of the rapid advance in vegetation, especially grass, from May to June, when late mists and dew resulted. The subsequent cropping of the grass might produce the second minimum in July.

Mr. Marriott exhibited a series of diagrams showing the relation of humidity to other elements at a selection of stations.

Mr. Bryant and Mr. Strachan also spoke.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

VISIBILITY AND THUNDERSTORMS.

THE discussion of these matters in your paper makes the following quotations from "The Voyage of the *Beagle*" appropriate. On page 4, writing of the Cape de Verd Islands, Darwin says :—

"One morning the view was singularly clear; the distant mountains being projected with the sharpest outline, on a heavy bank of dark blue clouds. Judging from the appearance, and from similar cases in England, I supposed that the air was saturated with moisture. The fact, however, turned out quite the contrary. The hygrometer gave a difference of 29·6°, between the temperature of the air and the point at which dew was precipitated. This difference was nearly double that which I had observed on previous mornings. This unusual degree of atmospheric dryness was accompanied by continual flashes of lightning. Is it not an uncommon case, thus to find a remarkable degree of aerial transparency with such a state of weather ?"

In Chapter III., page 61, he alludes to another matter which has been under discussion in these pages—the varying destructiveness of lightning in different regions. After a description of fulgurites found in the neighbourhood, he continues :—

"The neighbourhood of the Rio Plata seems particularly subject to electric phenomena. In the year 1793 one of the most destructive thunderstorms, perhaps, on record, happened at Buenos Ayres; thirty-seven places within the city were struck by lightning, and nineteen people killed. From facts stated in several books of travels, I am inclined to suspect that thunderstorms are very common near the mouths of great rivers. Is it not possible that the mixture of large bodies of fresh and salt water may disturb the electrical equilibrium ? Even during our occasional visits to this part of South America, we heard of a ship, two churches, and a house having been struck."

AGNES FRY.

Failand House, nr. Bristol, 7th December, 1914.

A REMARKABLE SERIES OF DRY YEARS.

THE November Magazine contained a letter describing the effects of the drought of August and September in South Cambridgeshire. Here too, we suffered considerably from want of water, which was due to a long series of years with deficient rainfall.

It occurred to me to examine the figures for the Marchmont station, which has a long record, as published in *British Rainfall*. The result was sufficiently interesting for publication. During the period 1896-1913, every year, except four, had a deficient rainfall, the average being taken for the period 1875-1909, and amounting to 33·76 in. The total shortage of rainfall from January, 1896, to the end of October, 1914, was 53·37 in., or more than one and a half times the average rainfall for one year.

Swinton House, Berwickshire. A. E. SWINTON.

THE FROSTS OF SEDGMOOR.

FROM the physical topography of its surroundings, as well as from the marshy character of the surface of this veritable bit of the Fen-country in mid-Somerset, it has always struck me that the historic vale of Sedgmoor must be liable to peculiarly severe frosts —both raw and bitter: and my impressions were confirmed whilst traversing the district on a Great Western express soon after 2 p.m. on December 24th last. On this occasion Sedgmoor was one vast frozen lake after the heavy rains, with the willow heads just above the surface of the ice, and shrouded in a steely-blue frosty fog, on which the low December sun-beams glanced idly, forming a wintry picture of the most fascinating character. We thus have in Somersetshire two great "moors," each possessing from different causes, a severe winter climate, viz., Exmoor, with its bleak winds and heavy snows, the highest ground in the county, and Sedgmoor, the lowest ground in the county, or nearly so, the receptacle into which the cold air from the various surrounding hill-ranges sinks and stagnates.

L. C. W. BONACINA.

Hampstead, N.W., 2nd January, 1915.

HEAVY RAINFALL AT HASLEMERE.

THERE has been unusually heavy rain in this district, as the following figures will show. The average of 22 years is: for the year, 35·57 in. (1914, 44·91 in.); for November, 3·48 in. (1914, 5·17 in.); for December, 3·87 in. (1914, 11·96 in.).

From November 24th to December 15th there was a rain spell of twenty-two days, yielding 10·01 in.; during this time there fell on November 30th, 1·11 in.; December 9th, 2·10 in.; December 12th, 1·00 in.; December 13th, 1·23 in.

During the forty-one days from November 24th to January 3rd, I give the following particulars:—

Nov. 24—30, 1914	...	7 days	... 2·83 in.
Dec. 1—31, ,,	...	31 ,,	... 11·96 ,,
Jan. 1—3, 1915	...	3 ,,	... 1·84 ,,
		41 days.	16·63 in.

Other wet periods may be noted in comparison:—

	in.		in.		in.		in.
1882—Oct.,	8·16;	Nov.,	4·13;	Dec.,	4·13	Three months,	16·42
	(Mr. J. M. Penfold, Courts Hill, Haslemere).						
1891—Oct.,	8·84;	Nov.,	4·83;	Dec.,	5·19	,, ,,	18·86
1911—Oct.,	5·65;	Nov.,	5·48;	Dec.,	10·65	,, ,,	21·78
1914—Oct.,	2·30;	Nov.,	5·17;	Dec.,	11·96	,, ,,	19·43

THOMAS P. NEWMAN.

Hazelhurst, Haslemere Surrey.

REVIEWS.

Report on the Administration of the Meteorological Department of the Government of India, in 1913-14. By Dr. G. T. Walker, C.S.I., F.R.S. Simla, 1914. Size 13 × 8. Pp. 14, 1 plate.

The Report gives a brief account of the existing arrangements for carrying out the work of the various departments of the Indian Weather Service, of the number of inspections made and new work projected, during the year. The general character of the work of the Observatories was satisfactory. Rainfall records were received in all from 2826 stations.

The activities of the service fall naturally under two heads, the directly useful and the scientific, or indirectly useful. Among the former may be mentioned the scheme for the re-organization of the storm-warning service, which has been submitted to the Government, and the extension of the use of wireless telegraphy in collecting ocean observations. It has also been found possible to apply better statistical methods to the investigation of monsoon forecasting, and these promise to lead to useful results. The special programme of upper air research undertaken in 1912 by Mr. J. H. Field, has, unfortunately, been hampered by delay in the construction of the Observatory, but pilot balloon work has been carried on.

The expansion of the work of the Office during the past decade is well shown in the form of a diagram. It is interesting to note that whilst in nearly every department the output has increased three or four-fold in that period, the total cost of the administration has remained practically stationary.

These short and simple annals of the Indian Meteorological Department do not entirely conceal the human element behind the official formality of their language, and those who are familiar with observational work may read much between the lines of the coldly tabulated statistics of "mistakes" on the part of Observers detected at headquarters. They may also read something of the constant supervision and watchfulness which are exercised to ensure the accuracy of the great masses of data published. C.S.

La Nebulosità in Italia [*Amount of Cloud in Italy*]; [From Annali del Ufficio Centrale di Meteorologia e Geodinamica, Vol. **35,** Part I., 1913]. By F. Eredia. Rome, 1914. Size 13 × 9½. Pp. 38.

Dr. Eredia deals with the cloud values for about 130 stations in Italy, and discusses the means for 10-day periods, the months, the seasons, and the year, the last three in comparison with Friedemann's results (Archiv. der deutchen Seewarte, 1913). The

monthly means are expressed in the form of sectional diagrams, showing the variations in seasonal march in relation to distance from the sea and to station elevation. Maps of the average distribution during the four seasons and during the year, and of the range between the most cloudy and least cloudy months are also given. The winter is the period of maximum cloud, the greatest amounts being recorded on the shores of the Adriatic. In summer the greatest amount of cloud is found, as might be expected, over the Alps, and during the year as a whole, the effect of land relief is strongly marked, the districts with more than 50 per cent. being closely coincident with the uplands. The range is greatest in Sicily, where December has between 60 and 70 per cent. of cloud, and July less than 20 per cent. The range diminishes with elevation, and is less than 20 per cent. in the Alps.

INTERNATIONAL BALLOON ASCENTS.

By W. H. Dines, F.R.S.

November 11th, 1911.

Starting Point.	Country.	A (H_c.) miles.	B (T_c.) ° F.	C miles.	D ° F.	E miles	F
Limerick.....	Ireland....	4·9	—63	8·9	—63	30	S.E. by S.
Manchester.....	England ..	4·7	—50	13·5	—46	45	E.N.E.
Brussels	Belgium ..	6·7	—72	15·0 ?	—60	120	N.E. by E.
Paris.....	France ...	6·1	—71	10·6	—66	144	N.E.
Munich	Germany..	..	..	6·9	—81	50	N.E. by E.
St. Petersburg ..	Russia	6·3	—81	10·2	—65	69	E.S.E.

A Height in miles of commencement of isothermal column.
B Temperature, F°., at bottom of column.
C Greatest height of reliable record in miles.
D Temperature, F°., at greatest height.
E Distance in miles of point where balloon fell.
F Bearing of falling point from starting point.

On this occasion two of the Continental balloons were not found, an unusual occurrence, and two of the instruments failed to register. The balloon sent up from Pyrton Hill burst prematurely at less than three miles height.

An extensive anti-cyclone lay over eastern Europe and a high pressure on Spain. Between these a low pressure area stretched from the Western Mediterranean to Iceland.

There are unusually large differences in the values both of H^c and of the temperatures, which is partly accounted for by the pressure distribution.

SCOTTISH METEOROLOGICAL SOCIETY.

THE Annual Business and General Meeting of the Society was held on 14th December, 1914, in the Goold Hall, Edinburgh, Mr. J. Mackay Bernard, President, in the Chair.

The Report from the Council referred to the great loss the Society had sustained through the deaths of Sir John Murray and Dr. R. T. Omond; to the fact that, under the arrangements recently arrived at with the Meteorological Committee, the Scottish area was now for the first time effectively represented in the Monthly Weather Report, whilst a more extensive system of inspection of stations had become possible; and to the Meteorological Conference which was to have been held in Edinburgh last September.

Dr. W. N. Shaw moved the adoption of the Report, and the following Council and Office-bearers were elected for the ensuing twelve months :—

President, J. Mackay Bernard; *Vice-Presidents*, Prof. R. A. Sampson, D.Sc., F.R.S., and C. T. R. Wilson, F.R.S.; *Council*, Prof. A. Crum Brown, M.D., LL.D., F.R.S., J. R. Milne, D.Sc., T. S. Muir, C. G. Knott, D.Sc., James Watt, W.S., A. Crichton Mitchell, D.Sc., Sir R. P. Wright, Prof. T. Hudson Beare, and J. D. Falconer, D.Sc.; *Hon. Secretary*, E. M. Wedderburn, D.Sc., W.S.; *Hon. Treasurer*, W. B. Wilson, W.S.

Mr. R. W. Wrigley, B.A., Assistant Astronomer, The Royal Observatory, Edinburgh, read a paper on "The Deep Rock Thermometers of the Calton Hill." An old series of observations from 1837-1876 had formed the basis of classic researches by Professor James D. Forbes amd Lord Kelvin, regarding the rate of conduction of heat through the rock. A new set of four thermometers was installed in 1880, the largest with its bulb 21 feet below the ground, and at that depth the highest temperature for the year occurred early in December, and the lowest early in June, whilst the average annual range was less than 2° F. The annual mean temperature for each thermometer showed many and notable fluctuations from year to year. As these fluctuations were always first visible on the shallower instruments and transmitted later to the deeper ones, it was demonstrated that the fluctuations did not arise from variations in the flow of heat from the earth's interior, but were due to external sources. A search for periodic variations had not been crowned with decided success, though there appeared to be evidences of a mean period equal to that of the sunspots, 11·13 years. This sunspot period had been found by Köppen and Newcomb to exist in air temperatures but the amplitude was too small to be important. Dr. Shaw, Professor Sampson, Dr. Knott, and the President took part in an interesting discussion, and Mr. Wrigley was cordially thanked for his paper.

RAINFALL TABLE FOR DECEMBER, 1914.

STATION.	COUNTY.	Lat. N.	Long. W. [*E.]	Height above Sea. ft.	RAINFALL OF MONTH. Aver. 1875—1909. in.	1914. in.
		° ′	° ′			
Camden Square	*London*	51 32	0 8	111	2·13	6·34
Tenterden	*Kent*	51 4	*0 41	190	2·77	7·15
Arundel (Patching)	*Sussex*	50 51	0 27	130	2·91	9·71
Fawley (Cadland)	*Hampshire*	50 50	1 22	52	3·23	9·37
Oxford (Magdalen College)	*Oxfordshire*	51 45	1 15	186	2·06	5·01
Wellingborough (Croyland Abbey)	*Northampton*	52 18	0 41	174	2·13	...
Shoeburyness	*Essex*	51 31	*0 48	13	1·71	4·08
Bury St. Edmunds (Westley)	*Suffolk*	52 15	*0 40	226	2·14	5·93
Geldeston [Beccles]	*Norfolk*	52 27	*1 31	38	2·07	5·51
Polapit Tamar [Launceston]	*Devon*	50 40	4 22	315	4·46	10·58
Rousdon [Lyme Regis]	,,	50 41	3 0	516	3·68	7·43
Stroud (Upfield)	*Gloucestershire*	51 44	2 13	226	2·71	6·59
Church Stretton (Wolstaston)	*Shropshire*	52 35	2 48	800	2·99	6·86
Coventry (Kingswood)	*Warwickshire*	52 24	1 30	340	2·66	5·38
Boston	*Lincolnshire*	52 58	0 1	11	1·88	4·48
Worksop (Hodsock Priory)	*Nottinghamshire*	53 22	1 5	56	2·17	4·07
Macclesfield	*Cheshire*	53 15	2 7	501	3·35	5·64
Southport (Hesketh Park)	*Lancashire*	53 39	2 59	38	3·10	5·10
Arncliffe Vicarage	*Yorkshire, W.R.*	54 8	2 6	732	6·75	10·42
Wetherby (Ribston Hall)	,, ,,	53 59	1 24	130	2·27	4·76
Hull (Pearson Park)	,, *E.R.*	53 45	0 20	6	2·32	4·64
Newcastle (Town Moor)	*Northumberland*	54 59	1 38	201	2·46	3·90
Borrowdale (Seathwaite)	*Cumberland*	54 30	3 10	423	15·14	18·44
Cardiff (Ely)	*Glamorgan*	51 29	3 13	53	4·70	8·19
Haverfordwest	*Pembroke*	51 48	4 58	90	5·18	9·61
Aberystwyth (Gogerddan)	*Cardigan*	52 26	4 1	83	4·66	9·57
Llandudno	*Carnarvon*	53 20	3 50	72	2·84	6·64
Cargen [Dumfries]	*Kirkcudbright*	55 2	3 37	80	4·84	8·58
Marchmont House	*Berwick*	55 44	2 24	498	2·83	5·30
Girvan (Pinmore)	*Ayr*	55 10	4 49	207	5·48	9·18
Glasgow (Queen's Park)	*Renfrew*	55 53	4 18	144	3·95	5·61
Inveraray (Newtown)	*Argyll*	56 14	5 4	17	8·57	9·67
Mull (Quinish)	,,	56 34	6 13	35	6·59	9·08
Dundee (Eastern Necropolis)	*Forfar*	56 28	2 57	199	2·67	4·42
Braemar	*Aberdeen*	57 0	3 24	1114	3·13	8·81
Aberdeen (Cranford)	,,	57 8	2 7	120	3·43	5·58
Cawdor	*Nairn*	57 31	3 57	250	2·53	...
Fort Augustus (S. Benedict's)	*E. Inverness*	57 9	4 41	68	5·62	7·57
Loch Torridon (Bendamph)	*W. Ross*	57 32	5 32	20	9·86	13·84
Dunrobin Castle	*Sutherland*	57 59	3 56	14	3·09	5·00
Wick	*Caithness*	58 26	3 6	77	3·11	3·28
Killarney (District Asylum)	*Kerry*	52 4	9 31	178	6·92	13·17
Waterford (Brook Lodge)	*Waterford*	52 15	7 7	104	4·32	9·64
Nenagh (Castle Lough)	*Tipperary*	52 54	8 24	120	4·34	6·10
Ennistymon House	*Clare*	52 57	9 18	37	5·03	9·30
Gorey (Courtown House)	*Wexford*	52 40	6 13	80	3·42	8·58
Abbey Leix (Blandsfort)	*Queen's County*	52 56	7 17	532	3·41	7·52
Dublin (Fitz William Square)	*Dublin*	53 21	6 14	54	2·27	6·19
Mullingar (Belvedere)	*Westmeath*	53 29	7 22	367	3·39	7·21
Crossmolina (Enniscoe)	*Mayo*	54 4	9 16	74	6·11	8·75
Cong (The Glebe)	,,	53 33	9 16	112	5·42	9·28
Collooney (Markree Obsy.)	*Sligo*	54 11	8 27	127	4·34	6·91
Seaforde	*Down*	54 19	5 50	180	3·77	8·84
Bushmills (Dundarave)	*Antrim*	55 12	6 30	162	3·87	4·93
Omagh (Edenfel)	*Tyrone*	54 36	7 18	280	3·91	6·65

RAINFALL TABLE FOR DECEMBER, 1914—*continued.*

RAINFALL OF MONTH (*con.*)					RAINFALL FROM JAN. 1.					
Diff. from Av. in.	% of Av.	Max. in 24 hours. in.	Max. in 24 hours. Date.	No. of Days	Aver. 1875—1909. in.	1914. in.	Diff. from Aver. in.	% of Av.	Mean Annual 1875-1909. in.	STATION.
+4·21	297	1·40	9	24	25·11	25·72	+ ·61	102	25·11	Camden Square
+4·38	258	1·20	9	27	27·64	32·43	+4·79	117	27·64	Tenterden
+6·80	334	2·08	9	23	30·48	36·29	+5·81	119	30·48	Patching
+6·14	290	1·80	9	26	31·87	38·67	+6·80	121	31·87	Cadland
+2·95	243	·79	28	26	24·58	26·90	+2·32	109	24·58	Oxford
...	...	...	...	...	25·17	...	...	...	25·17	Croyland Abbey
+2·37	239	1·12	9	24	19·28	19·89	+ ·61	103	19·28	Shoeburyness
+3·79	277	1·24	28	22	25·40	26·66	+1·26	105	25·40	Westley
+3·44	267	1·18	28	26	23·73	24·45	+ ·72	103	23·73	Geldeston
+6·12	237	1·18	28	27	38·27	49·18	+10·91	129	38·27	Polapit Tamar
+3·75	202	·88	12	23	33·54	42·52	+8·98	127	33·54	Rousdon
+3·88	243	·79	28	23	29·81	31·60	+1·79	106	29·81	Stroud
+3·87	229	1·05	27	23	32·41	34·90	+2·49	108	32·41	Wolstaston
+2·72	202	1·00	28	23	28·98	24·57	—4·41	85	28·98	Coventry
+2·60	238	1·24	28	22	23·35	22·09	—1·26	95	23·35	Boston
+1·90	188	·53	27	25	24·46	21·60	—2·86	88	24·46	Hodsock Priory
+2·29	168	1·12	27	23	34·73	38·64	+3·91	111	34·73	Macclesfield
+2·00	164	·85	3	23	32·70	32·12	— ·58	98	32·70	Southport
+3·67	154	1·40	3	25	61·49	61·81	+ ·32	101	61·49	Arncliffe
+2·49	210	·72	28	17	26·87	27·16	+ ·29	101	26·87	Ribston Hall
+2·32	200	·43	12	27	26·42	24·75	—1·67	94	26·42	Hull
+1·44	159	·82	12	23	27·94	27·89	— ·05	100	27·94	Newcastle
+3·30	122	3·90	17	21	129·48	128·91	— ·57	100	129·48	Seathwaite
+3·49	174	·87	17	30	42·28	50·11	+7·83	119	42·28	Cardiff
+4·43	186	1·50	26	25	46·81	50·55	+3·74	108	46·81	Haverfordwest
+4·91	205	1·62	27	25	45·46	49·41	+3·95	109	45·46	Gogerddan
+3·80	234	1·20	3	24	30·36	31·26	+ ·90	103	30·36	Llandudno
+3·74	177	1·22	4	20	43·47	46·71	+3·24	107	43·47	Cargen
+2·47	187	1·18	12	23	33·76	29·11	—4·65	86	33·76	Marchmont
+3·70	167	1·50	30	23	49·77	52·58	+2·81	106	49·77	Girvan
+1·66	142	1·34	2	20	35·97	33·41	—2·56	93	35·97	Glasgow
+1·10	113	1·50	2	23	68·67	72·24	+3·57	105	68·67	Inveraray
+2·49	138	1·11	1	24	56·57	56·18	— ·39	99	56·57	Quinish
+1·75	166	1·22	13	17	28·64	26·78	—1·86	94	28·64	Dundee
+5·68	282	2·20	2	23	34·93	38·77	+3·84	111	34·93	Braemar
+2·15	163	1·00	13	17	32·73	30·54	—2·19	93	32·73	Aberdeen
...	...	...	...	...	29·33	...	...	...	29·33	Cawdor
+1·95	135	1·38	2	21	44·53	42·44	—2·09	95	44·53	Fort Augustus
+3·98	140	2·24	7	19	83·93	94·99	+11·06	113	83·93	Bendamph
+1·91	162	·97	13	15	31·90	31·82	— ·08	100	31·90	Dunrobin Castle
+ ·17	105	...	...	...	29·88	28·74	—1·14	96	29·88	Wick
+6·25	190	2·04	1	27	54·81	65·31	+10·50	119	54·81	Killarney
+5·32	224	1·65	3	22	39·57	41·70	+2·13	105	39·57	Waterford
+1·76	141	·82	1	28	39·43	41·85	+2·42	106	39·43	Castle Lough
+4·27	185	·90	1	28	46·52	55·74	+9·22	120	46·52	Enniskymon
+5·16	250	1·36	25	23	34·99	36·96	+1·97	106	34·99	Courtown Ho.
+4·11	220	1·00	25	23	35·92	38·61	+2·69	108	35·92	Abbey Leix
+3·92	273	1·14	11	23	27·68	26·51	—1·17	96	27·68	Dublin
+3·82	212	1·10	28	21	36·15	39·34	+3·19	109	36·15	Mullingar
+2·64	143	1·01	1	28	52·87	55·09	+2·22	104	52·87	Enniscoe
+3·86	171	·87	1	28	48·90	54·91	+6·01	112	48·90	Cong
+2·57	159	·68	6	25	42·71	47·32	+4·61	111	42·71	Markree
+5·07	235	1·17	25	26	38·91	38·83	— ·08	100	38·91	Seaforde
+1·06	127	·58	4	21	37·56	35·36	—2·20	94	37·56	Dundarave
+2·74	170	1·20	20	24	39·38	41·59	+2·21	106	39·38	Omagh

SUPPLEMENTARY RAINFALL, DECEMBER, 1914.

Div.	STATION.	Rain inches.	Div.	STATION.	Rain inches.
II.	Warlingham, Redvers Road..	10·10	XI.	Lligwy	6·27
,,	Ramsgate	5·35	,,	Douglas	6·44
,,	Hailsham	9·23	XII.	Stoneykirk, Ardwell House...	6·35
,,	Totland Bay, Aston House...	9·07	,,	Dalry, The Old Garroch.....	..
,,	Stockbridge, Ashley..	8·53	,,	Beattock, Kinnelhead	8·66
,,	Grayshott	11·32	,,	Langholm, Drove Road	6·66
III.	Harrow Weald, Hill House...	6·91	XIII.	Meggat Water, Cramilt Lodge	2·50
,,	Caversham, Rectory Road ...	6·73	,,	North Berwick Reservoir.....	3·71
,,	Pitsford, Sedgebrook.....	5·46	,,	Edinburgh, Royal Observaty.	3·60
,,	Woburn, Milton Bryant.....	6·71	XIV.	Maybole, Knockdon Farm ...	4·22
,,	Chatteris, The Priory..... ...	5·07	XV.	Ballachulish House	17·46
IV.	Elsenham, Gaunts End	6·03	,,	Campbeltown, Witchburn ..	7·70
,,	Colchester, Hill Ho., Lexden	5·73	,,	Holy Loch, Ardnadam.....	11·15
,,	Ipswich, Rookwood, Copdock	6·12	,,	Islay, Eallabus	6·77
,,	Blakeney.....	4·86	,,	Tiree, Cornaigmore	7·35
,,	Swaffham	5·42	XVI.	Dollar Academy	7·85
V.	Bishops Cannings	5·42	,,	Balquhidder, Stronvar.....	13·50
,,	Wimborne, St. John's Hill ...	9·10	,,	Glenlyon, Meggernie Castle..	13·28
,,	Ashburton, Druid House.. ...	14·88	,,	Blair Atholl	7·91
,,	Cullompton	8·43	,,	Coupar Angus	6·69
,,	Lynmouth, Rock House	9·49	,,	Montrose, Sunnyside Asylum.	5·26
,,	Okehampton, Oaklands.. ...	11·82	XVII.	Alford, Lynturk Manse	6·19
,,	Hartland Abbey.....	5·81	,,	Fyvie Castle	4·40
,,	Probus, Lamellyn.....	8·73	,,	Keith Station	5·98
,,	North Cadbury Rectory.....	7·67	XVIII.	Rothiemurchus	5·79
VI.	Clifton, Pembroke Road.....	7·17	,,	Loch Quoich, Loan	20·40
,,	Ross, The Graig	6·48	,,	Drumnadrochit	6·40
,,	Shifnal, Hatton Grange.....	6·06	,,	Skye, Dunvegan	9·80
,,	Droitwich.....	5·82	,,	Lochmaddy, Bayhead	5·24
,,	Blockley, Upton Wold.....	7·16	,,	Glencarron Lodge	10·83
VII.	Market Overton.....	5·57	XIX.	Invershin	3·94
,,	Market Rasen	4·94	,,	Melvich	4·81
,,	Bawtry, Hesley Hall	3·81	,,	Loch Stack, Achfary	9·45
,,	Derby, Midland Railway.....	5·72	XX.	Skibbereen Rectory..... ..	11·35
,,	Buxton	8·17	,,	Dunmanway, The Rectory ..	14·02
VIII.	Nantwich, Dorfold Hall	6·27	,,	Glanmire, Lota Lodge.....	9·56
,,	Chatburn, Middlewood	6·24	,,	Mitchelstown Castle	7·95
,,	Cartmel, Flookburgh	...	,,	Darrynane Abbey.....	11·62
IX.	Langsett Moor, Up. Midhope	7·98	,,	Clonmel, Bruce Villa	9·58
,,	Scarborough, Scalby	4·82	,,	Newmarket-on-Fergus, Fenloe	6·49
,,	Ingleby Greenhow	6·87	XXI.	Laragh, Glendalough	6·83
,,	Mickleton	7·90	,,	Ballycumber, Moorock Lodge	5·24
X.	Bellingham, High Green Manor	7·37	,,	Balbriggan, Ardgillan	6·69
,,	Ilderton, Lilburn Cottage ...	5·53	XXII.	Woodlawn	6·76
,,	Keswick, The Bank.....	10·54	,,	Westport, St. Helens	8·76
XI.	Llanfrechfa Grange	9·07	,,	Dugort, Slievemore Hotel ..	10·66
,,	Treherbert, Tyn-y-waun	15·96	,,	Mohill Rectory	6·05
,,	Carmarthen, The Friary	10·15	XXIII.	Enniskillen, Portora.....	5·50
,,	Castle Malgwyn [Llechryd]...	...	,,	Dartrey [Cootehill]	6·53
,,	Crickhowell, Tal-y-maes.....	11·00	,,	Warrenpoint, Manor House ..	8·93
,,	New Radnor, Ednol	9·30	,,	Banbridge, Milltown	5·30
,,	Birmingham WW., Tyrmynydd	13·41	,,	Belfast, Cave Hill Road	7·36
,,	Lake Vyrnwy	9·51	,,	Glenarm Castle.....	10·07
,,	Llangyhanfal, Plâs Draw.....	7·49	,,	Londonderry, Creggan Res...	5·30
,,	Dolgelly, Bryntirion.....	10·43	,,	Dunfanaghy, Horn Head ...	7·19
,,	Bettws-y-Coed, Tyn-y-bryn...	12·32	,,	Killybegs	6·66

THAMES VALLEY RAINFALL —— DECEMBER, 1914.

WEATHER OF DECEMBER.

At the beginning of the month a large depression passed over the Kingdom in a north-easterly direction, causing unsettled weather generally. The heaviest rain fell in Scotland, and some stations in the Western Highlands recorded more than 1·00 in. on each of the first four days. On the 2nd 3·04 in. fell at Kenmore, 2·95 in. at Killin, and 2·94 in. at Meggernie Castle, and on the 3rd falls of 2·00 in. or more occurred at stations on both sides of the Irish Sea and as far north as Invergarry. A deep depression passed across the Kingdom from the west on the 4th, bringing squally weather. Southerly or south-westerly gales were experienced along the western coasts, and at Southport gusts blew at 88 miles per hour. The advance of further depressions from the Atlantic caused a continuance of the unsettled conditions and heavy rain fell daily in all districts. Temperature was above the average nearly everywhere, and the highest readings of the month occurred at most stations on the 6th or 7th. At Tottenham and Bath 57° was reached, and 50° was exceeded in all districts south of the Tweed. A depression which formed over the Bay of Biscay spread northwards on the 9th and occasioned freshening easterly winds and heavy rain over the south of England, more than 2·00 in. falling at many stations in the south-eastern counties. The south and east of Ireland experienced heavy rain on the 10th and 11th, when a depression hovered over the south-west of the Kingdom before passing away to the south-east. At Rathmines the fall of 1·62 in. on the 11th was accompanied by a heavy south-easterly gale. On the 13th more than 1·00 in. of rain fell over a great part of Scotland and at Lynturk it amounted to 2·40 in. Further heavy falls occurred on the 17th and 18th, when a low pressure system moved over the Kingdom from the west. Some high level stations in Wales and the Lake District had more than 3·00 in. of rain on either day, and at Seathwaite there was 3·90 in. on the 17th. Temperature remained high generally until the 19th, when it failed to reach 40° in some parts of Scotland and Ireland. On this day minima of 22° and 23° occurred at Balmoral and Crieff respectively. Glazed frosts were reported at Duns and West Witton on the 21st and 22nd. Anticyclonic conditions set in on the 22nd and temperature became low, falling to 7° at Balmoral on the 22nd. A large depression appeared off Ireland on the 25th and caused increasing southerly winds in the west and north with a renewal of the heavy rain. At Glendalough there was 2·07 in., and at Lochgoilhead 2·43 in. With the advance of this depression in an easterly direction rain fell heavily over the whole of the Kingdom. On the evening of the 28th the southern and midland counties of England experienced a destructive south-westerly gale accompanied by heavy rain and snow. More than 1·00 in. fell at most stations and there was 1·77 in. at Upton Wold and 1·75 in. at Melbourne.

In London the month was unprecedentedly wet, the total rainfall measured at Camden Square, 6·34 in., being the greatest recorded in that month in 57 years' record. Only three other months in that period had more rain, viz., June, 1878, August, 1878, and June, 1903. The mean temp., 42°·4, was 2°·7 above the average. The duration of sunshine was 26·9 hours, and of rain 117·5 hours, the latter being the greatest recorded in any month in the past 34 years. Evaporation ·05 in.

More than 10 in. of rain fell during the month over a large area in the south of England, and in Devon some stations had about 15 in. The fall diminished towards the east, and in the Isle of Thanet only 4 in. fell. In England the fall varied from about 4 in. in the estuary of the Humber to more than 20 in. in the Lake District, and at the Stye there was 27 in. In Scotland it ranged from 2 in. on the shores of the Moray Firth and 3 in. on the Firth of Forth, to 20 in. at Loan, in the Western Highlands. In Ireland there was less than 5 in. in the extreme north, but more than 10 in. in the south and south-east, and 18 in. at the Gap of Dunloe.

The general rainfall, as a percentage of the average, was as follows :— England and Wales, 201 ; Scotland, 152 ; Ireland, 187 ; British Isles, 183.

Climatological Table for the British Empire, July, 1914.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Date.	Minimum. Temp.	Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	Total Rain. Depth.	Days.	Aver. Cloud.
								0-100			inches		
London, Camden Square	93°7	1	47°3	30	74°6	55°6	56°3	78	133°8	42°2	1·26	15	7·5
Malta	89·2	17	66·5	19	78·5	67·6	...	74	138·0	...	·00	0	0·3
Lagos	88·0	23	68·0	30	82·8	73·1	71·5	83	154·1	64·0	9·68	18	9·3
Cape Town	79·3	11	35·3	1	65·3	47·8	48·7	75	...	...	4·30	11	4·3
Natal, Durban ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Johannesburg	70·9	29	35·4	11	62·4	42·0	34·0	59	..	27·2	·00	0	0 1
Mauritius	78·3	6	54·0	23	74·6	62·3	60·3	77	...	46·0	2·52	22	4·9
Bloemfontein	...	...	...	...	...	...	...	...	...	...	...	...	...
Calcutta...	92·0	1, 9	76·8	7	87·8	79·5	78·3	87	...	75·0	16·78	20	9·1
Bombay...	89·4	2	74·9	24	84·8	78·7	77·5	87	130·8	67·6	31·12	31	8·8
Madras	104·1	1, 6	75·6	15	96·6	79·6	71·3	66	157·4	73·9	2·60	19	8·2
Colombo, Ceylon ...	87·4	20	72·7	7	86·0	77·0	74·6	80	156·5	70·8	3·76	17	7·2
Hongkong	92·2	25	74·4	30	86·9	78·1	76·1	83	...	...	26·31	17	6·9
Sydney	63·5	3	39·3	16	58·3	47·4	43·5	73	109·2	30·0	8·76	15	5·2
Melbourne	65·4	25	31·5	21	54·9	41·0	40·0	72	114·9	22·9	1·84	16	6·0
Adelaide	70·0	25	35·8	20	60·5	44·4	42·4	69	125·9	23·9	1·39	14	5·3
Perth	68·3	19	37·2	5	62·1	46·3	46·5	75	131·3	28·9	4·44	18	4·7
Coolgardie	71·2	20	33·4	6	61·5	41·8	39·7	61	134·0	24·4	·72	9	4·2
Hobart, Tasmania ..	66·5	26	31·1	22	51·2	39·3	37·0	70	108·3	24·1	2·57	23	5·9
Wellington ...	57·4	8	31·2	5	53·1	42·7	41·3	78	108·6	23·0	2·49	15	6·7
Auckland	62·5	7	36·5	18	55·8	44·6	45·0	83	129·0	32·0	4·08	23	6·0
Jamaica, Kingston ..	95·3	28	71·6	30	91·6	74·3	69·6	68	...	...	·18	5	2·7
Grenada	87·0	24	72·0	*13	84·0	74·5	...	80	136·0	...	6·72	25	4·5
Toronto	92·6	11	47·9	20	80·5	60·4	59·0	70	143·0	44·0	1·00	11	4·4
Fredericton	89·0	15	40 0	2	77·0	50·4	...	72	...	...	2·37	10	4·8
St. John, N.B. ...	75·7	25	47·0	2	66·7	52·3	54·0	80	...	...	2·52	10	5·3
Alberta, Edmonton ...	87·9	3	41·3	29	76·3	53·3	...	64	139·8	35·8	2·69	11	4·5
Victoria, B.C.	80·3	17	48·2	6	67·6	51·8	49·0	71	...	...	·00	0	3·2

Johannesburg.—Bright sunshine 314·5 hours.

Mauritius.—Mean temp. of air 0°·4, dew point 0°·6 above, and R ·13 in. below, averages. Mean hourly velocity of wind 11·1 miles.

COLOMBO, CEYLON.—Mean temp. of air 81°·5, or 0°·4, dew point 0°·4, above, and R 1·69 in. below, averages. Mean hourly velocity of wind 5·0 miles.

HONGKONG.—Mean temp. of air 81°·9. Mean hourly velocity of wind 11·5 miles. Bright sunshine 180 1 hours.

Melbourne.—Mean temp. of air 0°·5 below, and R normal.

Adelaide.—Mean temp. of air 0°·9 above, and R 1·25 in. below, averages.

Coolgardie.—Temp. of air 0°·7 above, and R slightly below, average.

Hobart.—Temperature practically normal.

Wellington.—Mean temp. of air 47°·9 or 0°·4 above, and R 3·35 in. below, averages. Bright sunshine 117·8 hours. Frosts on nine days.

Auckland.—Rainfall ·87 in. below average.

ALBERTA, EDMONTON.—Warm, sunny and dry month. TSS on 11 days. Hai 1 in. in diameter.